SUBSTITUTE SPECIFICATION 09/821,730

ORDER ALLOCATION MANAGEMENT METHOD AND ORDER ALLOCATION MANAGEMENT SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to an order allocation management method and management system thereof.

In businesses where manufacturers deal with customers directly, transactions utilizing computer networks such as the Internet are rapidly increasing. A server typically provides product information through the Internet, and customers can operate a computer terminal on their end to select their product choices. In some on-line systems, customers can select different constructions and optional parts of the end products they desire to purchase, and send requests for final estimates to the server. When the server returns an estimate, if desired, the customers can place their orders. Once the server has received the orders from the customers, the server can send order information to a host computer. Based on the order information, the host computer can automatically issue instructions and the like for shipment and order processing of the parts needed in the end product. The instructions are transferred to assembly lines of personal computers, warehouses, and management departments to proceed with shipping processing. The sales cost can be remarkably reduced if all steps from ordering to issuing of instructions are automatically processed by a computer system.

However, conventional techniques such as those described above can suffer from drawbacks. At the time of issuing final estimates to customers, the inventory of the parts comprising a particular product are checked in order to allocate the parts to be used for that product. More specifically, the estimates are issued only

after all of the parts inventory has been confirmed. However, in many cases, a certain time-lag exists between the time the order is finalized and the time when the estimate is issued to the customer. Also, in some cases, shipment cannot be processed until payment from the customer is confirmed even though the order is finalized. Meanwhile, a number of customers can connect to the server and place orders. At this point, if some parts are allocated to the order while other allocated parts are reserved at the time of estimate, and the order is not finalized after issuing the estimate, then the parts will not be shipped. There is a need for processes that can optimize the parts allocation system for first-in first-out processing of the parts and the like.

SUMMARY OF PREFERRED EMBODIMENTS OF THE PRESENT INVENTION

An aspect of the present invention provides an order allocation management method which performs processing to create a parts order list after allocating parts existing in the inventory list based on order information to record on memory storage of a computer, to refer each part listed on a latest inventory list for order priority information indicating order shipment priority after the order is confirmed, and to create a confirmed parts list reallocating parts having the highest priority.

The order information can include information parts estimate, processing of customer ordering and similar information. An order will be confirmed after processing such as receipt of payment. The parts can be either finished products or partly finished products. After referring to an inventory list at the time of ordering, a computer automatically processes allocation of equivalent parts when parts being allocated to, become out of stock between ordering and order confirmation. To match with the parts order list, parts in the inventory list are individually allocated. Order priority information is attached with each part in the inventory list indicating order shipment priority. The parts having the highest order priority

in the list are subject to be shipped first.

Automatic reallocation can allow first-in, first-out (FIFO) processing even when the parts are not out of stock. More specifically, the parts that are still in stock at the time of reallocation even the parts that are already allocated based on the order information, and the parts can be allocated for the confirmed order considering first-in, first-out processing.

Equivalent parts can include parts having the same model number but different manufacturers, parts having the same manufacturer but different manufacturing date, and parts having the same model number but different purchase price. The parts include an intangible option and the like found in various services besides the parts of the products to be actually sold. In addition to the latest inventory list, the memory storage of the computer includes the order priority information of each part to be allocated for order processing. The order priority information is the information indicating which parts have priority in shipment when two or more equivalent parts exist. Shipping direction based on the confirmed parts list automatically optimizes the allocation of off-the-shelf parts in a manner such as first-in, first-out management.

According to another aspect of the present invention, the order priority information can include priority information according to time of parts purchase. When a plurality of equivalent stock exists, one of the parts will be allocated. It is possible to allocate one of the parts, but for instance, give the parts having old purchase date with high priority order. This method enables first-in, first-out management among the parts and alternative parts.

According to another aspect of the present invention, the order priority information can include priority information according to purchase price.

For instance, when the purchase prices of parts have been changed, the parts purchased at higher price are given higher priority order. The purchase prices of the parts normally decrease gradually, it is possible to manage in first-in, first-out manner by giving a priority to the parts purchased before price change. When the prices are the same, order priority information at the time manufacture, for instance, can be used as a standard.

According to another aspect of the present invention, the order priority information can include priority information according to construction of the parts. When the construction of parts has been changed, it is possible to manage in first-in, first-out manner by giving priority to the parts before construction change. When the constructions are the same, order priority information at the time manufacture, for instance, can be used as a standard.

According to another aspect of the present invention, the parts order list can be created by allocating the parts actually existing in the inventory list. As a result, the parts confirmed to be in stock at the time of ordering can be specifically allocated.

According to another aspect of the present invention, order allocation management method can create parts order list by displaying the part names of the parts existing in the inventory list. As a result, the part names only in the parts order list are displayed if the parts are in stock at the time of ordering. Actual and specific allocation can be executed after the order is confirmed.

According to another aspect of the present invention, the confirmed part list can be created by reallocating the parts with highest order priority out of all the equivalent parts for the parts existing in the inventory list including the part being listed up on the parts order list. Reallocation can be optimized by temporarily allocating parts in the parts order list, and checking the order priority of all

equivalent parts in the inventory list after the order is confirmed.

According to another aspect of the present invention, the confirmed parts list can be created by reallocating the parts with highest order priority out of all the equivalent parts for the parts listed up on the parts order list, but not found in the inventory list. As a result, only the parts being out of stock in the parts order list can be reallocated when the order is confirmed.

According to another aspect of the present invention, the order allocation method can allocate the parts having the highest priority order to build up finished products based on a tree-shaped list in which the finished products are placed on a trunk, and equivalent parts are individually placed on a plurality of branches that branch from the trunk. The finished product can be placed on the trunk closest to a root of a tree in the tree-shaped list. Each branch can be a trunk to build up the parts placed on each branch. In this manner, a freely branched tree-shaped list can be obtained. The assembly parts needed to build up finished products will be outlined on a pathway of the tree-shaped list when tracing back a list considering the order priority from the root to a terminal branch. This can enable the combination of allocation parts by computer processing to simplify allocation.

According to another aspect of the present invention, the tree-shaped list can be created such that all parts, placed on a pathway of the tree-shaped list when the above tree-shaped list is traced back from a root to any of the terminal branches by selecting one of the plurality of branched branches, consist of only normally functioning parts by combining each other. Even if accessories of the equivalent parts are different, a parts list clearly showing the combination of the parts and its accessories are required. Creating a tree-shaped list can uniquely allow allocation of all correct parts by tracing back the list in order. The most appropriate parts combination can be selected by considering the order priority of the parts.

According to another aspect of the present invention, the order allocation management method can allocate each part such that all parts, placed on a pathway of the tree-shaped list, when the tree-shaped list is traced back from a root to any of the terminal branches by selecting one of the plurality of branches based on a stock list and order priority information, consist of a combination of the parts having the highest priority to build up the finished products shown in the root. This process can allow a computer system to create a part combination list considering the inventory list and order priority information directly from the tree-shaped list without man-assisted handling and to issue shipping instructions and the like.

Another aspect of the present invention provides an order allocation management system. The order allocation management system includes parts order list creation means to create the parts order list allocating parts existing in an inventory list based on order information and that stores the parts order list in a memory storage of a computer; and confirmed parts list creation means to adapted to create a confirmed part list for each part existing in a latest inventory list after confirmation by reallocating each part having high order priority by referring to the order priority information showing the shipment priority of the order.

According to another aspect of the present invention, the confirmed parts list creation means can allocate parts having the highest order priority to build up a finished product based on a tree-shaped list in which the finished product is placed on a trunk, and equivalent parts are individually placed on a plurality of branches that branch from the trunk.

According to another aspect of the present invention, the tree-shaped list can be such that all parts, placed on a pathway of the tree-shaped list when the tree-shaped list is traced back from a root to any terminal branch by selecting one of the plurality of branches, consist of only normally functioning parts by combining each other.

According to another aspect of the invention, the confirmed parts list creation means can be such that all parts, placed on a pathway of the tree-shaped list when the tree-shaped list is traced back from a root to any terminal branch by selecting one of the plurality of branches based on a stock list and order priority information, consist of combination of the parts having the highest priority to build up the finished products shown in the root.

A computer readable recording media which records a computer program to execute in sequence processing to create a parts order list allocating the parts existing in an inventory list based on order information and that stores the parts order list in memory storage of a computer, and to create a confirmed part list regarding each part existing in a latest inventory list after confirmation by reallocating each of the parts having high order priority by referring to the order priority information showing the shipment order priority.

The present invention can provide order allocation management wherein optimum off-the-shelf parts are automatically selected and allocated by utilizing computer system on issuing instructions for shipment processing of the parts to be built up of a plurality of parts.

Brief Description of The Drawings

FIG.1 is a block diagram showing a preferred implementation of a system according to the present invention.

FIG.2 is a diagram illustrating contents of order priority.

FIG.3 is a flowchart showing operation of a system according to the present invention.

FIGs.4 (a) and (b) are schematic diagrams showing different operation

models of preferred implementations of systems according to the present invention.

FIG.5 is a diagram describing the contents of equivalent parts list and confirmed parts list created based on the order priority.

FIG.6 is an operation flowchart describing the operation of confirmed parts list creation means.

Detailed Description of Preferred Embodiments of the Invention

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. In the drawings, the thickness of layers and regions are exaggerated for clarity. Like numbers refer to like elements throughout.

An example in which preferred implementations of the present invention (are used) will now be described.

This system can be used to optimize part allocation of products in the following case, for instance. First, according to the orders of the products from four customers K1, K2, K3, and K4, parts A1, A1, A2, and A2 for the products are individually allocated for each customer respectively. Part A1 and A2 are worth exactly the same values and either one of them can be allocated, but A1 has an older manufacturer date. Stocks of these parts have been confirmed at the time of ordering. However, customers K1 and K4 made an payments right away and their

orders were confirmed, but the payment from customers K2 and K3 were delayed, and their order confirmations were delayed. In this case, parts reallocation is performed at the time when the orders of customers K1 and K4 were confirmed. More specifically, reallocation of parts A1, A1 is performed individually for customers K1 and K4. Later, reallocation of parts A2, A2 is performed individually for customers K2 and K3 when the orders of customers K2 and K3 are confirmed. Consequently, equivalent parts A1, A1, A2, and A2 will be shipped in order of the length of time from the manufacturer's date regardless of the allocation order.

An example of a direct sale system of personal computer will now be described.

Such a system can be designed such that a customer can choose the construction of personal computer in detail with various parts of personal computer capable of being ordered together. For each of these parts, allocation processing considering individual stock status at the time of ordering is required. When the number of parts is large, reallocation processing at the time of order confirmation become quite complex. The present invention can automatically process reallocation through computer.

FIG. 1 is a block diagram showing a preferred implementation of the present invention. The system can include, for example, a server 10, parts order list creation means 11, confirmed parts list creation means 12 and memory storages 21, 22, 23, 24. The memory storage 21 stores a parts order list 31. This parts order list 31 is created by allocating off-the-shelf parts when a customer places an order. In this example, before an order is confirmed, it is called a parts order list 31, and a list created after the order is confirmed and reallocation is processed, it is called a confirmed part list 34.

The memory storage 22 stores an inventory list 32. The inventory list 32 is

the latest list to be updated at appropriate timing. The parts order list creation means 11 can be a computer program to perform processing in creating parts order list at the time of ordering by referring this inventory list 32 and after confirming its inventory. The memory storage 23 stores an order priority information 33. The order priority information 33 provides information indicating which part is shipped by priority when two or more equivalent parts exist. This information is used for such first-in, first-out management. The confirmed parts list creation means 12 can be a computer program to perform processing in creating confirmed parts list by referring to the inventory list 32 and the order priority information 33 when the order is confirmed.

FIG. 2 is a diagram describing the contents of order priority. When two or more equivalent parts exist, older parts are shipped in order for first-in, first-out management. Therefore, the older parts are selected and being allocated at the time of order confirmation. Whether the parts are new or old, for instance, will be decided by a time of purchasing standard. Also, besides the time of purchasing, factors determining the shipping order of the parts can vary. As shown in the figure, order priority indicating which part needs to be shipped faster shall be determined by considering purchase price, construction, and other various factors collectively. The results will be recorded in the column of total order. When the equivalent parts differ only by the model number, decision that which parts are shipped faster will be automatically determined based on the order priority information. When model numbers of a plurality of parts are the same and their priority numbers are the same as well, any parts can be allocated first.

In the example shown in the figure, the type of off-the-shelf parts of part A is A1, A2, A3, and A4. These stock numbers are also recorded. The confirmed parts list creation means 12 checks if any parts are fully in stock at the time of order confirmation. If the parts are in stock, based on the total order, part A1 is firstly given a priority for allocation. When part A1 becomes out of stock, part A2, the

second in the total order will be allocated. When this part A2 becomes out of stock, part 3, the third in the total order is allocated.

Furthermore, date processing of the inventory list will be described here using an example explained earlier. If there are parts A1, A1, A2, and A2 in the inventory list, Parts A1, A1, A2, and A2 are allocated individually when each customer places an order. Every time a part is allocated, a flag indicating already being allocated will be put on an attribute data. The parts with no flag are subject to be allocated when the first order is placed. Parts A1 and A2 worth exactly the same values and either one of them can be allocated, but A1 has an older manufacturer date. Then, customers K1 and K4 made payments right away and their orders were confirmed, but the payments from customers K2 and K3 were delayed, and their order confirmations were delayed. In this case, parts reallocation is performed including the parts with flags at the time when the orders of customers K1 and K4 were confirmed.

Furthermore, all parts A1, A1 A2, and A2 have the flags in this example, but all parts regardless of the presence and absence of the flag are subject to be reallocated. First, reallocation of the parts A1, A1 is performed individually for customers K1 and K4. This confirms the allocation of parts A1, A1, thus the parts will be removed from the inventory list or will be excluded from the targets for the subsequent reallocation. At this point, only A2, A2 are available for reallocation.

Furthermore, reallocation of the parts A2, A2 is performed individually for customers K2 and K3 when the orders of customers K2 and K3 are confirmed. If there is new shipment of the equivalent parts up to this point, there will be no reallocatable parts in the inventory list. In this manner, parts will be shipped in order of the length of time from the manufacturer's date regardless of the allocation order.

FIG. 3 illustrates a flowchart showing the operation of a preferred implementation of the present invention.

First, an order information 15 is entered through a server 10 at Step S1. If the content of the order information 15 are parts with their names A, B, C, and D, in Step S2, the parts order list creation means 11 refers to an inventory list 32. Then, in accordance with the order information, the stock of parts A2, B3, C1, and D2 will be allocated. The parts order list 31 created at Step S3 will be stored in the memory storage 21.

In the next Step S4, the confirmed order information 16 will be entered through the server 10. In the Step S5, the confirmed parts list creation means 12 read out the parts order list 31 from the memory storage 21.

Furthermore, only parts in the stock will be listed for the identical part name with the parts in the parts order list 31 by referring the latest inventory list at Step S6. For instance, if there is no part A2 in stock, the parts A1, A3 and A4 will be listed for part's name A. In the next Step S7, parts on the list that should be given shipment priority will be selected by referring to order priority information 33. If the part A3 is selected here, in Step S8, the chosen part A3 is written on the confirmed parts list.

Next, in Step S9, whether the processing from Step S6 to Step S8 for all the parts have been completed will be determined. If it was not completed, return to Step S6. When the processing from Step S6 to Step S8 for all parts are completed, finish a series of processing by writing the confirmed parts list at Step S10 on the memory storage 24. The confirmed parts list 34 stored on the memory storage 24 will be transferred to shipping department, for instance, to be used for the printing and the like of request instructions.

FIGs. 4 (a) and (b) are schematic diagrams showing different operation models of preferred implementations of systems according to the present invention.

In FIG. 4(a), the parts order list creation means 11 creates parts order list that listing only the parts' names of the ordered parts based on the order information 15. More specifically, the parts order list creation means 11 only checks the presence of the corresponding parts' names by referring the inventory list 32 and simply stores the order information 15 on the memory storage 21. More specifically, the parts order list creation means 11 checks the presence or absence of the parts in stock or its allocation are not required. If the ordered parts have been already checked whether they are targeted parts for the inventory at the time of ordering, the parts order list may be simply created from the order information. More specifically, parts order list creation means 11 does not need to refer to the inventory list. Then, the confirmed parts list will be created in exactly the same process when the order is confirmed. In this example, the processing to create the parts order list is facilitated, and stored data is also simplified. Furthermore, since the confirmed parts list 34 is created only after the latest inventory list 32 and the order priority information are referred to, allocation can be optimized.

In FIG. 4(b), the parts order list creation means 11 creates the parts order list 31 considering the order priority by referring the inventory list 32 and the order priority information 33. In this manner, the confirmed parts list creation means 12 can create the confirmed parts list 34 by using the exact contents in the parts order list 31 as long as stocked parts exist. More specifically, only the parts out of stock are reallocated using the order priority information.

Furthermore, in the cases being described using FIG. 1 and FIG. 4(a), confirmed parts list creation means 12 can be designed to create the confirmed parts list 34 by using the exact contents in the parts order list 31 as long as the stocked parts exist.

FIG. 5 is a diagram describing the contents of equivalent parts list and confirmed parts list created based on the priority order. If, for instance, assembly parts of a processor (substrate loaded with a processor) and a heat sink in the figure for the parts of the personal computer is available. The assembly parts like this need to be allocated as a set. Furthermore, if there are two kinds of heat sinks attachable to a processor, one of them needs to be allocated in accordance with the above priority order. Optimization method of the parts reallocation processing using the order priority information for such assembled parts will be described below.

As shown in the figure, an equivalent parts list 30 is a so-called hierarchical structured data like a branch. This equivalent parts list 30 is designed to place a finished product "type K personal computer by Company A" on the position of a trunk 41 and equivalent parts are placed in order on branches 42 and 43 branched from this trunk 41. Using this tree as an example, allocation process of the assembled parts of the processor and the heat sink will be described. The confirmed parts list 35 lists up the assembled parts to be allocated considering the priority order.

If there are two kinds of equivalent processors here to be used for a personal computer, a processor xxx is placed on the branch 42 and a processor yyy is placed on the branch 43. These two kinds of processors in the figure have the same model number but different manufacturer's dates. Also, in the case where the constructions of an accessory, a heat sink is slightly different due to the different manufacturer's date shown.

If there are two kinds of equivalent heat sink attachable to the processor xxx, at this time, if branch 42 where processor xxx is placed were a trunk, heat sink ha is placed on the branch 45 and heat sink hb is placed on the branch 46. Also, if there are two kinds of equivalent heat sinks attachable to the processor yyy, at this

time, if branch 43 where processor yyy is placed were a trunk, heat sink ha is placed on the branch 47 and heat sink hc is placed on the branch 48.

In this manner, when type K personal computer by Company A is being built up, there are two kinds of equivalent parts available for processor only and four kinds if the combination with heat sinks is included. Furthermore, the heat sink ha is attachable to both processor xxx and processor yyy, but heat sink hb is attachable to processor xxx only, and the heat sink hc is attachable to processor yyy only.

If this kind of allocation of the parts is manually performed, extensive knowledge of parts and a number of their manuals will be required. In this example, a tree-shaped list as shown in the figure is created automatically by utilizing the computer system to show the combination pattern of the equivalent parts to build up a finished product. This part allocation processing allows computer system to automatically select the appropriate combination of the parts after the order is confirmed. More specifically, it is designed such that all parts, placed on its pathway when the tree-shaped list is traced back from the root to any of the terminal branch by selecting one of a plurality of branched branch in the figure, consist of only normally functioning parts by combining each other.

When the branch 42 and branch 46 in the equivalent parts list 30 in the figure are traced back from the trunk 41 as shown with the broken line arrow, a confirmed parts list 35 indicating a parts group such that a processor xxx and heat sink hb are attached on the type K personal computer by A firm. Other parts of this personal computer, for instance, hard disk drive, floppy disk drive, display and the like can be selected in a similar manner. In a case where a plurality of mutually closely related parts are combined to obtain finished products, the creation of the tree-shaped list allows computer system to uniformly perform parts selecting processing considering the priority order previously explained.

Furthermore, both equivalent parts lists 30 shown in FIG. 5 are equivalent in light of function, one of them can be freely selected to assemble a personal computer for the shipment. Next, the operation of the confirmed parts list creation means 12 shown in FIG. 1 will be described. Its general operation is the same as the one explained in FIG. 1 or FIG. 3, operations, especially a unique operation when the tree-shaped equivalent parts list 30 in FIG. 5 is used will be mainly explained.

FIG. 6 is a flowchart describing the operation of the confirmed parts list creation means according to one embodiment of the present invention. First, parts' names placed on the individual branch are obtained by tracing all branches from the trunk of the equivalent part list 30 in FIG. 5 in Step S1. In this manner, an off-the-shelf parts list is referred for all parts listed in the equivalent parts list 30 in the next Step S2, and the presence or absence of the stock will be determined at Step S3. If the parts are in stock, jump to Step S5. If not, the parts will be removed from the equivalent parts list 30 as the parts cannot be used. At this point, terminal side of the tree from the branch that the parts are placed, more specifically, the opposite side of the branch against the trunk will be entirely removed.

In Step S5, whether the above processing was completed for all parts should be determined and the processing from Step S1 to Step S5 will be repeated until all parts are complete. In this manner, after the equivalent parts list is organized such that all parts placed on the individual branch on the equivalent parts list 30 are in stock, the selection of parts considering the order priority will be started. First, in Step S6, type K personal computer by A firm on the trunk of the equivalent parts list 30 is traced back to downward in order. If a branch is not diverged when it moves from the trunk to the branch, the parts placed on the trunk or individual branch are simply transferred to the confirmed parts list. However, each branch is diverged in the example shown in FIG. 5. When a diverged branch is detected, the branch with higher priority order is selected (Step S7) and the parts of the chosen

branch in the confirmed parts list are included (Step S8). In Step S9, it is determined whether next branch is available, and if the next branch is available, return to Step S7 to repeat the same processing. The above operations complete the optimized parts selection considering order priority of the off-the-shelf parts.

Although an order sales system using a personal computer was described above, the present invention can be widely applied for various parts of ordering a sale. The present invention is not limited to finished products and parts; rather the present invention can also allow optimum allocation alternative parts for paired parts which are sold together. Also, the present invention can be used for services such as tours, for example, organized by a travel agent. For instance, the assignment of a hotel room can be processed by granting equivalent rooms as with the above equivalent parts. This invention could allow automatic optimization of room assignments when travel request is actually placed after the travel reservations are made.

Also, in the example above, although an order sale system utilizing the Internet was explained, the present invention could also be used for a system in which reallocation of the parts is performed eventually for parts production and shipment after the manufacturer places an order for parts and the parts are allocated.

Furthermore, each functional block shown in the embodiment above can consist of individual program module or combined program module. Also, part of these functional blocks can be consisted from a logical circuit hardware. Also, each program module can be operated by combining pre-existing application programs or be operated as an independent program.

The computer program to realize the present invention described above can be stored in a computer readable recording media such as CD-ROM and be installed

for use. Also, this program can be used by downloading in the computer memory through a network. In these cases, it is desirable to establish automatic processing for optimizing reallocation of the parts to facilitate first-in and first-out operation of the parts.

The present invention may be embodied in other specific forms without departing from its essential characteristics. The described embodiment is to be considered in all respects only as illustrative and not as restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of the equivalence of the claims are to be embraced within their scope.